

Advanced Microeconomics Exam Solutions

Midterm exam: Advanced Microeconomics, with Solutions SS 2012

1. Define a relation \succeq on \mathbb{R}_+^2 by letting $(x_1, x_2) \succeq (y_1, y_2)$ if and only if $x_1 > y_1$ or both $x_1 = y_1$ and $x_2 \geq y_2$. Show that \succeq is reflexive, complete, and transitive, but has no utility representation.

Solution: Let (x_1, x_2) and (y_1, y_2) be two elements of \mathbb{R}_+^2 . If we have $x_1 > y_1$ or $x_2 > y_2$, the elements are comparable. If not, then $x_1 = y_1$. Since the usual ordering of real numbers is complete, either $x_2 \geq y_2$ or $y_2 > x_2$. So the elements are comparable in this case too. Since both elements can coincide or be distinct, we have shown that \succeq is both reflexive and complete. Now let (x_1, x_2) , (y_1, y_2) , and (z_1, z_2) be elements of \mathbb{R}_+^2 such that $(x_1, x_2) \succeq (y_1, y_2) \succeq (z_1, z_2)$. In order to show that \succeq is transitive, we have to show that $(x_1, x_2) \succeq (z_1, z_2)$. Two elements can only be indifferent if they coincide. So we can restrict ourselves to the interesting case $(x_1, x_2) \succ (y_1, y_2) \succ (z_1, z_2)$. If $x_1 > y_1$ then also $x_1 > z_1$, hence $(x_1, x_2) \succ (z_1, z_2)$. If $x_1 = y_1$ then $x_2 > y_2$. Since $y_1 \geq z_1$, this means either $x_1 > z_1$ or $x_1 = z_1$ and $x_2 > z_2$. In both cases $(x_1, x_2) \succ (z_1, z_2)$.

We now show that \succeq has no utility representation by contradiction. Suppose $u : \mathbb{R}_+^2 \rightarrow \mathbb{R}$ is a utility representation for \succeq . Now for every $x \in \mathbb{R}_+$, $(x, 1) \succ (x, 0)$ and hence $(u(x, 0), u(x, 1))$ is a nonempty open interval and contains a rational number. So let $f : \mathbb{R}_+ \rightarrow \mathbb{Q}$ be a function such that $f(x) \in (u(x, 0), u(x, 1))$ for all $x \in \mathbb{R}_+$. We show that f is an injection from the uncountable set of nonnegative real numbers to the countable set of rational numbers, which is impossible. Let $x > y$. Then $(x, 1) \succ (x, 0) \succ (y, 1) \succ (y, 0)$. Hence the intervals $(u(x, 0), u(x, 1))$ and $(u(y, 0), u(y, 1))$ are disjoint, so $f(x) \neq f(y)$, which shows that f is injective.

2. Let F be a non-empty finite set and \succ be an acyclic binary relation on F . Show that there exists $x^* \in F$ such that $x \succ x^*$ holds for no $x \in F$.

Solution: We prove the result by contradiction. Suppose there is no such x^* . Then we can find for each $x \in X$ an $x' \in X$ with $x' \succ x$. Therefore, we can construct a sequence (x_1, x_2, \dots) of elements of X such that $x_{n+1} \succ x_n$ for all indices n . If there exists n and m such that $x_n = x_{n+m}$, then $x_n \succ x_{n+1} \succ \dots \succ x_{n+m} = x_n$, which violates acyclicity. So all terms of the sequence are distinct, which shows that we have found infinitely many different elements in the finite set F . This is impossible.

Advanced microeconomics exam solutions are an essential resource for students and educators navigating the complexities of microeconomic theory. As students delve into topics such as consumer behavior, production theory, market structures, and welfare economics, they often encounter challenging problems that require a deeper understanding of the concepts and mathematical tools involved. In this article, we will explore various aspects of advanced microeconomics exam solutions, including common topics covered, effective study strategies, and resources that can enhance your preparation for exams.

Understanding Advanced Microeconomics

Advanced microeconomics builds upon the foundational principles of

microeconomic theory, emphasizing mathematical modeling and rigorous analysis. Key topics typically covered in advanced microeconomics courses include:

- Consumer Theory
- Producer Theory
- Market Structure and Game Theory
- General Equilibrium Theory
- Welfare Economics
- Information Economics

These subjects require a strong grasp of mathematical concepts, including calculus and linear algebra, as well as an ability to apply theoretical models to real-world situations.

Common Topics in Advanced Microeconomics Exams

When preparing for advanced microeconomics exams, it is crucial to understand the core topics that frequently appear in exam questions. Here are some of the most common areas students should focus on:

1. Consumer Theory

Consumer theory examines how individuals make decisions to maximize their utility given their budget constraints. Key concepts include:

- Utility Functions
- Indifference Curves
- Budget Constraints
- Marshallian and Hicksian Demand Functions
- Price Elasticity of Demand

Exam questions may involve deriving demand curves, analyzing the effects of

price changes, or solving utility maximization problems.

2. Producer Theory

Producer theory focuses on how firms make production decisions to maximize profits. Important topics include:

- Production Functions
- Cobb-Douglas Production Function
- Cost Minimization
- Profit Maximization
- Returns to Scale

Students may be required to solve problems related to cost functions, marginal products, and optimal input combinations.

3. Market Structures

Different types of market structures lead to varying competitive outcomes. Key areas of study include:

- Perfect Competition
- Monopoly
- Monopolistic Competition
- Oligopoly

Questions often involve analyzing firm behavior in different market settings, calculating equilibrium prices, and understanding the implications of market power.

4. Game Theory

Game theory is crucial for analyzing strategic interactions between rational

agents. Topics include:

- Normal Form Games
- Extensive Form Games
- Nash Equilibrium
- Subgame Perfect Equilibrium
- Dominant Strategies

Exam problems may require students to identify equilibria, analyze strategic moves, and evaluate the outcomes of different game scenarios.

5. General Equilibrium and Welfare Economics

General equilibrium theory analyzes how supply and demand interact across multiple markets. Key concepts include:

- Pareto Efficiency
- Welfare Theorems
- Externalities
- Public Goods

Students may be asked to demonstrate the efficiency of resource allocation or assess the impact of externalities on welfare.

Effective Study Strategies for Advanced Microeconomics

Preparing for advanced microeconomics exams requires strategic planning and effective study habits. Here are some tips to help you succeed:

1. Review Course Materials

Ensure you have a solid understanding of the course material. Revisit lecture notes, textbooks, and supplementary readings to reinforce your knowledge of key concepts.

2. Practice Problem-Solving

The best way to prepare for exams is to practice solving problems. Work through past exam papers, and textbook exercises, and seek out additional problem sets. Focus on areas where you feel less confident.

3. Form Study Groups

Studying with peers can enhance your understanding of complex topics. Discussing problems and solutions with classmates can provide new insights and make studying more engaging.

4. Utilize Online Resources

There are numerous online platforms that offer practice questions, video tutorials, and interactive quizzes on advanced microeconomics. Websites such as Khan Academy, Coursera, and various university resources can be valuable tools.

Resources for Advanced Microeconomics Exam Solutions

To further aid your preparation, consider utilizing the following resources:

1. Textbooks

Some recommended textbooks for advanced microeconomics include:

- “Microeconomic Theory” by Andreu Mas-Colell, Michael D. Whinston, and Jerry R. Green
- “Advanced Microeconomic Theory” by Geoffrey A. Jehle and Philip J. Reny
- “Microeconomic Analysis” by Hal R. Varian

These texts provide comprehensive coverage of microeconomic theory and include numerous exercises for practice.

2. Online Courses

Consider enrolling in online courses or lectures that focus on advanced microeconomics. Platforms like edX and Coursera offer courses from reputable universities that can deepen your understanding of the subject matter.

3. Study Guides and Solutions Manuals

Many textbooks come with solutions manuals or study guides that provide step-by-step solutions to problems. These resources can be invaluable for understanding the methodologies used in solving complex questions.

Conclusion

In conclusion, mastering advanced microeconomics requires a combination of theoretical knowledge, problem-solving skills, and effective study strategies. By focusing on key topics, practicing extensively, and utilizing available resources, students can enhance their understanding and performance in advanced microeconomics exams. Whether you are preparing for a challenging exam or simply seeking to deepen your knowledge of microeconomic theory, remember that consistent practice and a strategic approach will lead to success.

Frequently Asked Questions

What topics are typically covered in an advanced microeconomics exam?

Advanced microeconomics exams usually cover topics such as consumer theory, producer theory, game theory, general equilibrium, and welfare economics.

How can I effectively prepare for an advanced microeconomics exam?

To prepare effectively, review lecture notes, solve past exam papers, study key concepts in depth, participate in study groups, and utilize textbooks and online resources.

What types of questions can be expected on an advanced microeconomics exam?

Expect a mix of theoretical questions, mathematical problems, and application-based scenarios that require analysis of economic models.

What role do graphical methods play in advanced microeconomics exams?

Graphical methods are crucial for illustrating concepts such as indifference curves, budget constraints, and supply and demand curves, helping to analyze and explain economic behavior.

How important is understanding game theory for an advanced microeconomics exam?

Understanding game theory is essential, as it provides insights into strategic interactions among agents, which is a key aspect of modern microeconomic analysis.

What are some common pitfalls to avoid when taking an advanced microeconomics exam?

Common pitfalls include misinterpreting questions, neglecting to show work in mathematical problems, and failing to apply theoretical concepts to practical scenarios.

Can real-world economic issues be integrated into advanced microeconomics exam solutions?

Yes, integrating real-world issues can enrich exam solutions, demonstrating the application of microeconomic theory to actual economic phenomena.

What resources are recommended for additional practice in advanced microeconomics?

Recommended resources include textbooks such as 'Microeconomic Theory' by Mas-Colell, Whinston, and Green, online courses, and economic journals that publish relevant research.

How do I approach solving complex utility maximization problems on the exam?

Break down the problem into manageable steps: set up the Lagrangian, derive first-order conditions, and solve for optimal consumption bundles while keeping constraints in mind.

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